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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/526,258	09/12/2005	Alastair Dent	53037-7007	7061

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EXAMINER	
PILKINGTON, JAMES	

ART UNIT	PAPER NUMBER
3656	

NOTIFICATION DATE	DELIVERY MODE
10/13/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

IPDOCKET@UHLAW.COM

Office Action Summary	Application No.	Applicant(s)	
	10/526,258	DENT, ALASTAIR	
	Examiner	Art Unit	
	JAMES PILKINGTON	3656	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 September 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3,5-10,15-18,24 and 25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3,5-10,15-18,24 and 25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *01 March 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Prosecution Application

The RCE filed on September 10, 2009 is acceptable and an action on the RCE follows.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 8, 9, 15-17, 24 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harris, WO 02/060653, in view of Akin, USP 4,565,104.

Harris discloses a back-drivable surgical robot head comprising:

- a frame (6)
- an arm (12) for carrying a tool (14) the position of which is to be controlled;
- a manually-graspable driving member (16) on said arm (12);
- a first rotation control mechanism (20) for rotating the arm about a first axis (A1) with respect to said frame (6)
- the first rotation control mechanism (28) comprising a first rotational motor (30)
- in which the first motor (30) is mounted for pivotal motion with respect to a frame of the head

- a second rotation control mechanism (20) for rotating the arm about a second axis (A1), the said mechanism comprising a second rotational motor (2)
- the first axis (A2) is perpendicular to the second axis (A1)
- the arm (12) is extendible along a third axis (A3)
- in which the first (A2), second (A1) and third axes (A3) intersect at a point
- a force sensor (18) for sensing forces applied to the driving member (16) by a user;
- wherein the first rotational control mechanism (28) is arranged to rotate the arm about the first axis in response to the sensed forces.

Harris does not disclose that the rotation control mechanisms comprising a lead screw having a rotational motor at one end and said lead screw and motor being mounted at said one end to pivot with respect to a frame and a bearing which moves longitudinally of the lead screw as it rotates, the bearing being pivotally coupled to an offset crank of or secured to the arm.

Akin teaches rotation control mechanisms comprising a motor (29), a lead screw (24) wherein the motor (29) and the lead screw (24) a mounted at said one end to pivot with respect to a frame (12 pivots about 15 which is secured to an exterior frame) and a bearing (37) which moves longitudinally of the lead screw (24) as it rotates, the bearing being pivotally coupled to an offset crank (32) of or secured to an arm (34/35) for the purpose of providing a linear actuator to rotate a load that minimizes loss of moment arm at the extremes of rotational travel of the load.

It would have been obvious to one having ordinary skill in the art to modify Harris and provide a first and second rotation control mechanism that comprises a lead screw and a bearing which moves longitudinally of the lead screw as it rotates, and motor being mounted at said one end to pivot with respect to a frame, the bearing being pivotally coupled to an offset crank of or secured to the arm, the lead screw has a high lead angle, resulting in the lead screw being mounted for pivotal motion with respect to a frame of the head, as taught by Akin, for the purpose of providing a linear actuator to rotate a load that minimizes loss of moment arm at the extremes of rotational travel of the load. In additional substituting one transmission mechanism for another would have been obvious to one having ordinary skill in the art. The combination would result in a device which would operate with a lead screw which would pivot between a zero position and a maximum pivot position relative to the frame when a applied force is sensed.

Claims 3 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harris, WO 02/060653, in view of Akin, USP 4,565,104 and further in view of Yamanaka, USP 4,825,714.

Harris in view of Akin discloses all of the claimed subject matter discussed above.

Akin does not disclose that the motor is directly secured to the lead screw, without any intervening gears.

Yamanaka teaches a lead screw drive arrangement wherein the motor (11) is directly secured to the lead screw (15), without any intervening gears.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute the motor spindle arrangement of Akin with the direct drive system of Yamanaka, for the predictable result of removing play/backlash that is found between intervening gears.

Claims 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harris, WO 02/060653, in view of Akin, USP 4,565,104 and further in view of Zufle, US PGPub 2003/0109953.

Harris in view of Akin discloses all of the subject mater as discussed above.

Harris does not disclose a first sensor for measuring the position of the arm and a second sensor for measuring the rotation of the motor and sounding an alarm if there is an inconsistency.

Zufle teaches a detection system which uses a first sensor for measuring the position of an arm/movement member (detector 5) and a second sensor for measuring the rotation of the motor (paragraph 0025) and sounding an alarm if there is an inconsistency (sets down drive 3 or paragraph 0017) for the purpose of providing a direct and indirect detection method to ensure movement of the arm is correct (paragraph 0015 and 0025).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Harris and provide a first sensor for measuring the

position of the arm and a second sensor for measuring the rotation of the motor and sounding an alarm if there is an inconsistency, as taught by Zufle, for the purpose of providing a direct and indirect detection method to ensure movement of the arm is correct.

Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Harris, WO 02/060653, in view of Akin, USP 4,565,104 and further in view of Zimmerman, USP 6,494,005.

Harris in view of Akin discloses all of the subject matter as discussed above.

Harris does not disclose that the arm is extendible on a third lead screw which is rotated by a third rotational motor.

Zimmerman teaches an arm (12) extendable on a lead screw (50) which is rotated by a motor (30) for the purpose of concealing the motor within an arm segment (C1/L45-52) which in turn reduces the size of the device.

It would have been obvious to one having ordinary skill in the art to replace the rack and pinion drive system of Harris with a third lead screw which is rotated by a third rotational motor, as taught by Zimmerman, for the purpose of concealing the motor within an arm segment which in turn reduces the size of the device.

Response to Arguments

Applicant's arguments filed September 10, 2009 have been fully considered but they are not persuasive.

In response to applicant's argument that Akin is nonanalogous art in view of the amendment introducing the term "surgical" in the preamble, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, Akin is reasonably pertinent to the particular problem of an actuation/drive mechanism for a machine to convert linear motion to large-angle motions and this motion is a robotic movement. Furthermore, the term "surgical" in the preamble is an intended use limitation and does not limit the body of the claim to any particular structure.

In addition, Harris does not mention or suggests that a drive system from one or the other can not be incorporated into the other. In the above rejection the drive system of Harris is being replaced or substituted with a different system which would yield the predictable result of moving the robotic device. The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art.

The Applicant argues that the linear actuator of Akin is not back drivable and thus the combination not proper.

Any linear screw and nut system, as in the Akin reference and the instant application, is back drivable regardless of the thread pitch. The claim does not recite any specific back drivable structure and a screw and nut system can be driven in reverse, either by hand or a motor. In the case of Akin the device is attached to a motor which can be run in forwards and reverse thus making the system back drivable.

The Applicant has also provided supporting evidence for a meaning of "back-drivability." However, the combination of Harris and Akin results in a device which meets this definition; this "back-drivability" feature is found in the primary reference to Harris and is the same as that of the instant application. The replacement of the drive system of Harris with that of Akin does not alter the operation of the device of Harris and results in a back drivable device.

Also, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JAMES PILKINGTON whose telephone number is (571)272-5052. The examiner can normally be reached on Monday - Friday 7-3.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Ridley can be reached on (571)272-6917. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/JAMES PILKINGTON/
Examiner, Art Unit 3656
10/2/09

/Thomas R. Hannon/

Primary Examiner, Art Unit 3656